TERRA

MAY / JUNE 1999 ■ VOLUME 36 NUMBER 3

A message from the director

What can be more of a manifestation of spring and summer than butterflies? We invite you to join us for a season of celebrating these beautiful creatures in two new exhibitions opening at the Museum of Natural History in May. In the ground floor galleries of the Exposition Park museum, we have butterflies from around the world, drawn from our collection of hundreds of thousands of specimens. Our new exhibition, *Butterflies in Living Color,* features the largest, the smallest, the most abundant, and the rarest for visitors to marvel at and enjoy, as well as answers to some of the questions our entomologists are most often asked about these spectacular yet mysterious insects.

And on the museum's south lawn, we present the *Pavilion of Wings,* a wonderful new butterfly house. Inside you will encounter some of the loveliest of our North American species, including Monarchs, swallowtails, and painted ladies—all alive and on the wing in the sunshine.

The new attractions come out of two strong programs at the museum. The butterfly pavilion is an extension of our very popular Insect Zoo, where live insects and other arthropods have been delighting visitors for more than 7 years now. And *Butterflies in Living Color* highlights the results of scientific research grounded on insect collections like our own, which now numbers more than 5 million specimens. The exhibit also explores some of the puzzles about butterflies that today's entomologists are endeavoring to solve.

I know you will enjoy these two new exhibitions. And I hope that this special issue of TERRA will inspire you to bring the magic of butterflies into your own backyard through an easy and environmentally sound way of gardening.

James L. Powell

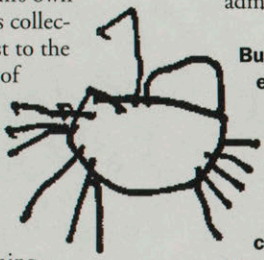
NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

Two new exhibitions open at the Exposition Park museum in May . . .

BUTTERFLIES IN LIVING COLOR

May 29 through September 6

More than 100 specimens of butterflies and moths, from the museum's own world-class collections, attest to the vast range of sizes and shapes of these beloved insects as well as their stunning beauty. The complex life cycle of the lepidopterans is explored through interactive exhibitry, and the special adaptations of various species are vividly recounted. In a recreation of a field research camp, you will learn about the butterfly mysteries that scientists are still seeking to unravel; here you can also watch as a curatorial expert demonstrates how—insect by insect—our great collection of butterflies has been prepared and preserved.



PAVILION OF WINGS

South Lawn, May 29 through September 6

A butterfly haven has been created in the heart of the city! In this beautifully landscaped and enclosed pavilion on the Exposition Park museum's south lawn, you'll find hundreds of lively, free-flying butterflies, including large swallowtails, named for the graceful flared design of their hind wings, pugnacious sulphurs and whites, tiny iridescent blues, and inquisitive fritillaries as well as lunas and several other species of spectacular moths. Admission to the pavilion is $3, adults, $2, students and senior citizens, and $1, children 5 to 18; children under 5 and museum members are admitted free of charge.

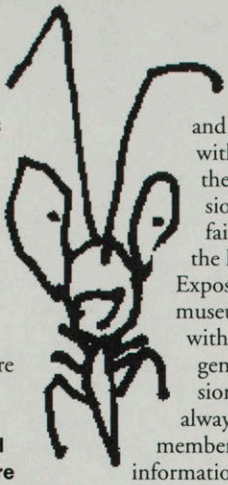
Butterfly activities and events for families are planned throughout the run of the special butterfly exhibitions; for more information, please consult your new bimonthly calendar of events, *The Naturalist*, or call the museum's Education Division at 213/763-3534.

And we celebrate insects in general at the Insect Fair!

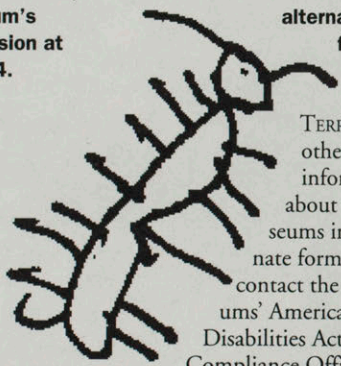
INSECT FAIR

May 15 and 16, 10 a.m. to 4 p.m., Museum of Natural History

Anything "buggy" can be found at the Insect Fair, from beetle jewelry to live and preserved insects. The largest event of its kind in the nation, the weekend exposition is fun for the entire family, with more than 60 exhibitors from around the world presenting an array of arthropods as well as books, toys, teaching tools, and craft items with an insect theme. Admission to the fair, which fills the halls of the Exposition Park museum, is free with museum general admission, which is always free to members. For more information, please contact the Insect Zoo at 213/763-3558.

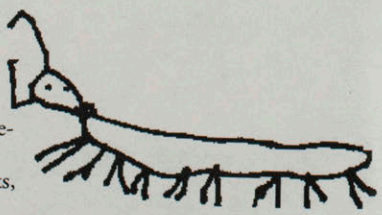


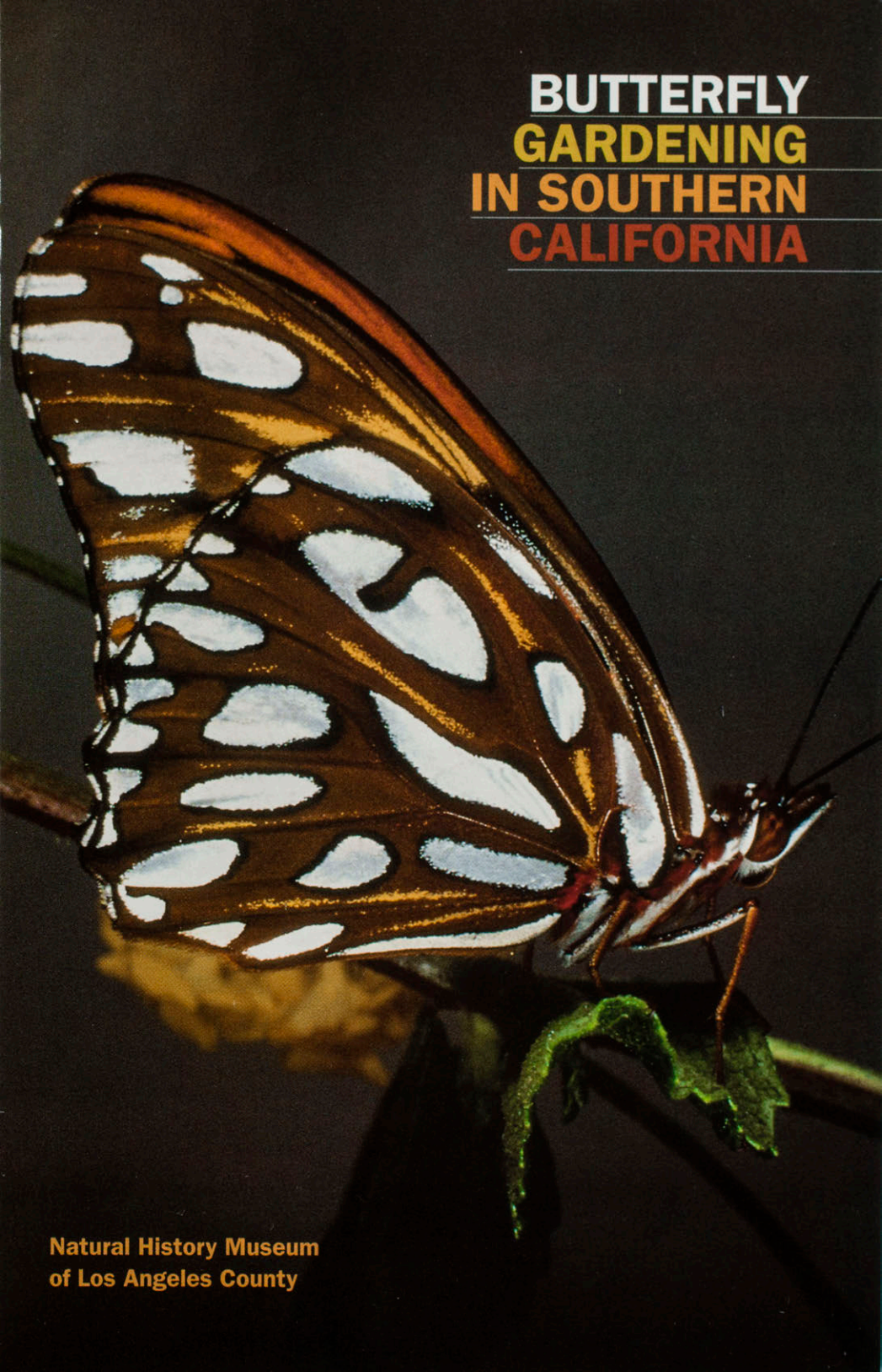
The *Pavilion of Wings* is sponsored by HomeBase, Inc.



Notice for materials in alternate format. If you require TERRA or other printed information about the museums in an alternate format, please contact the museums' Americans with Disabilities Act (ADA) Compliance Officer at 213/763-3417 (voice) or by calling that number via the California Relay Service at 800/735-2929 (TTY).

The drawings of insects are from *Bugs at the Natural History Museum*, a drawing by museum member Jack Zierhut, age 5





BUTTERFLY GARDENING IN SOUTHERN CALIFORNIA

Natural History Museum
of Los Angeles County

I am very concerned about what I call the *extinction of experience*—the loss of everyday species within our own radius of reach. When we lose the common wildlife in our immediate surroundings, we run the risk of becoming inured to nature's absence, blind to delight, and, eventually, alienated from the land. This is where butterfly gardeners come in—they create and maintain diverse habitats for species that need not become endangered, bolster the numbers of species in our midst, and collectively engage themselves in the rewarding nearness of nature.

Robert Michael Pyle, in Butterfly Gardening: Creating Summer Magic in Your Garden *(Xerces Society/Smithsonian Institution & Sierra Club Books, 1998)*

Cover: Gulf Fritillary © Jerry F. Butler & Don W. Hall, Univeristy of Florida. *Above:* Cloudless Sulphur © 1998 Stuart Wilson

BUTTERFLIES IN LIVING COLOR

THE NATURALIST DONALD CULROSS PEATTIE (1898 to 1964) reflected the feelings of many of us when he wrote that "the beauty of a butterfly's wing, the beauty of all things, is not a slave to purpose, a drudge sold to futurity. It is excrescence, superabundance, random ebullience, and sheer waste to be enjoyed in its own high rights." But of course the colors of the wings of butterflies are not aimed at us, a fact that makes them all the more wonderful to me. Instead, their bright hues allow them to blend in, stand out, find mates, or repel predators and to survive and prosper in a competitive and hostile environment. The intricate patterns have often evolved through their interactions with another group of animals with good color vision, the birds, which are the most relentless natural enemies of butterflies.

Although their attractiveness is on one level simply an evolutionary byproduct, butterflies are still among the most beautiful animals on earth. In the minds of most people, they are set quite apart from other insects: with their bright colors and inclination to be active on warm, sunny days, they seem somehow more related to their nemeses, the birds, than to their cousins, the cockroaches and ants. In spite of their flamboyant appearance, however, butterflies—with their three-part bodies (head, thorax, and abdomen), six legs, and two pairs of wings—are clearly part of the Insecta.

In fact, butterflies belong to the most successful group of insects, named the Holometabola in reference to its members' four-stage or "complete" metamorphosis, in which the developing insect not only undergoes changes in its size but also striking transformations in its body form and habits. Each stage—from egg to larva to pupa to adult—is specialized to perform a certain function, and the full life cycle of the holometabolan thus has great overall efficiency.

The larva or caterpillar of the butterfly is essentially an eating machine that uses its powerful jaws to ingest the huge amounts of food necessary to build and maintain tissues needed later in life by the adult; all of the growth in the life cycle takes place in the larval stage. Although a caterpillar appears to have more than the usual number of legs for an insect, the three ordinary pair on the thorax behind the head are simply supplemented by—depending on the species—up to five pairs of "prolegs," fleshy grasping structures along the rest of the body that will disappear during pupation.

The Leaf Butterfly of Formosa *(Kallima inachus formosana, right and below)* is a particularly good mimic of a dry leaf, down to the "stem" of a projection at the back of the hind wings.

© 1992 Michael Parsons (top and bottom)

The most misunderstood life stage occurs next, when the caterpillar is transformed into the seemingly motionless pupa or chrysalis. Although we think of this as a "resting" time akin to hibernation, it is actually a period of intense development: within the hardened shell of the pupa, the insect's tissues are almost completely liquified and reorganized from the wormlike larval structures into the relatively delicate forms of the adult.

The sole purpose of the final stage, which begins when the adult butterfly emerges from the pupal casing and may last a few days or many months, is to disperse, mate, and pass on genes to the next generation, ensuring that the species continues.

With the moths, butterflies make up the order Lepidoptera; the name, meaning "scaly wing," refers to the flattened scales—actually modified hairs—that cover the adults' wings, overlapping like shingles. Through pigmentation or prismlike refraction of sunlight, the scales give the lepidopterans their distinctive colors.

Butterflies are a minority within the Lepidoptera, making up only about 15 percent of the order's more than 150,000 species. Although they are overall more brightly colored, color alone is not reliable in distinguishing butterflies from moths, as some of the latter are quite beautifully colored and patterned. Perhaps the easiest way to determine if a lepidopteran is a butterfly is to look for the distinctive thickening or knob at the terminus of each antenna; moths may have threadlike, sawtoothed, or feathery antennae, but almost all lack swellings at the ends. In addition, most moths rest with their wings flattened down over their bodies or against the surface under them; in contrast most butterflies sit with their wings pressed together vertically over their backs.

Butterflies represent millions of years of adaptations and experiments in form, chemistry, and behavior. The wing colors and patterns that distinguish individual species may be useful to them in finding others of their kind with which to mate. But as with other brilliantly hued insects, they would

This owl butterfly, *Caligo idomeneus* from South America, has a wingspan of more than 5 inches and a dramatic set of eyespots on the underside of its hind wings.

DICK MEIER (TOP AND BOTTOM)

appear to have a disadvantage in trying to elude predators. However, through their colors, some butterflies are actually sending messages to the animals that might feed on them.

The larva of the Monarch, a large orange and black butterfly, feeds on milkweeds, and the toxic chemicals in these plants are passed on by the caterpillar to the adult, which is then distasteful or even poisonous to its natural enemies. In other butterfly species, it is the adult that ingests poisonous substances by sipping the nectar or other secretions of certain plants. Whatever the source, butterflies stocked full of toxins typically advertise their awful taste to potential predators by displaying bright warning colors, often with an orange theme. Once a bird has tried to eat such a butterfly, it quickly learns to associate the bad experience with the insect's color pattern and to avoid that type of meal in the future.

In butterflies, an entire "industry" has evolved around this strategy. Perfectly edible butterflies borrow a bad reputation by closely resembling notoriously distasteful species. The vast number of mimics among the Lepidoptera is a testament to the persistent pressure—and the good eyesight and memories—of birds and other animals that would eat butterflies.

Mimicry doesn't stop here. Bad-tasting butterfly species in an area tend to look like each other. Apparently, this convergence on a common warning pattern simplifies things for predators, making it easier for them to learn to associate just one or two butterfly color formats with a meal to be avoided.

In addition to employing brilliant hues to avoid predation, butterflies can also resort to camouflage. When resting and perhaps most vulnerable to being eaten, most butterflies fold their wings together over their bodies, displaying the undersides. The patterns and markings of the underwings of many butterflies are extremely good copies of dead leaves, right down to simulations of fungus growth and "holes" from insect feeding. The predation pressure must be overwhelming to produce such exquisite copies of random objects in the environment.

This juvenile Eastern Bluebird *(Sialia sialis)* has found a Monarch larva and is preparing to bash it against a branch to stun or kill it. The young bird may become ill if it persists with its plan to eat this caterpillar, which has ingested toxins with a diet of milkweed.

© Johann Schumacher/VIREO

Many species of butterflies are under the threat of extinction. Although collectors are sometimes blamed for butterfly rarity, the destruction of natural habitat for human uses is by far the most important cause. Locally, two tiny butterflies, the El Segundo and the Palos Verdes Blues, have very small populations in the little pockets of their habitats remaining along the Los Angeles County coast. Worldwide, there are many endangered species whose habitats are being restricted or eliminated by conversion of forests to pastures, crop lands, or cities and suburbs.

In spite of our extensive urban sprawl, southern California still has many species of butterflies that are fairly abundant and easily attracted to flowers or food plants in local gardens. Some species have found ornamental plants from distant parts of the world acceptable as food and have been able to flourish in spite of the changes to the landscape that people have made. The caterpillars of other butterfly species feed on grasses, lawn weeds, or shade trees, and the adults drink from relatively unspectacular but nectar-rich flowers like lantana. Still other species live in our surrounding wilderness areas and can venture into the suburbs from their mountain strongholds.

All of the common local butterflies described in this booklet can prosper in the Los Angeles area in spite of human modification of their habitat. With a minimum of encouragement, they will continue to brighten our backyards.

Brian V. Brown
Associate Curator of Entomology

Brian Brown has pursued an interest in insects since he was 5, when he created an insect zoo in his backyard in Toronto, Canada. He studied insects at the University of Guelph and then at the University of Albert, where he received his doctorate. As head of the Natural History Museum's Entomology Section, Dr. Brown has responsibility for a collection that includes one of the world's largest assemblages of phorid flies; his research focuses on "ant-decapitating" phorids, a group whose parasitic members show promise as biological agents for controlling fire ants and other pest species.

The quote from Donald Culross Peattie appeared in *Butterflies and Moths,* edited by Norman Riley (Viking, 1970).

TAKE A BUTTERFLY TO LUNCH

WHERE HAVE ALL THE BUTTERFLIES GONE? In 1927, Dr. John A. Comstock, dean of southern California lepidopterists, wrote about a silver-spotted butterfly now known as Comstock's Fritillary: "When the grassy foothills have changed their verdant spring garb for the tan of late May and June, this spangled beauty comes forth, to flaunt its lustrous wings in the bright sunlight." The fritillary was originally described in 1925 from specimens taken in Griffith Park, where it was then abundant. But today, Comstock's Fritillary is not found in the Los Angeles Basin, and many other formerly common butterflies are quite uncommon or totally absent. Why? To answer this question, you need a little information about butterfly biology.

In the previous article, Brian Brown has described the four stages in the life cycle of a butterfly. Two of these—the caterpillar and the adult—require food. Although butterflies do not grow, they need nourishment to have the energy for flight. Some butterflies have obvious preferences for certain types of food, but most visit a wide variety of plants in search of nectar.

The feeding requirements of caterpillars—the larval stage where all growth in butterfly species occurs—are a different story. Some species can use many different plants as hosts, but many are much more fastidious. Some, like the Cabbage White, restrict their diet to the members of one family of plants; others, such as the Gulf Fritillary, confine their feeding to just one kind of plant or to a few that are very closely related.

This food plant specificity of caterpillars helps explain where the butterflies have gone. The major cause for their disappearance in a given area is almost always habitat destruction and the elimination of the plants that they need to survive. The caterpillars of Comstock's Fritillary, for example, feed on one or two species of hilly grassland violets that are now extremely rare in southern California.

Despite the loss of native habitat in the Los Angeles Basin, a number of species of butterflies have been able to continue their existence here, albeit sometimes somewhat precariously. There are several possible reasons for the continuing success of a particular species. It may inhabit relatively undisturbed parts of the basin, or its larvae may feed on weeds. Or the caterpillars may feed on plants that people have

DICK MEIER

From the collections of the Natural History Museum, some of the butterflies that can be lured into southern California gardens. *At left, from top down:* Gulf Fritillary (about 2½ inches across), Anise Swallowtail, Gray Hairstreak *(left)* and Wandering Skipper, and Monarch. *Center, from top down:* Marine Blue *(left)* and Fiery Skipper, Pygmy Blue *(left)* and Cabbage White, American Lady, Mourning Cloak, and Common Checkered Skipper *(left)* and West Coast Lady. *At right, from top down:* Cloudless Sulphur, Painted Lady, Common Buckeye, Red Admiral, and Funereal Duskywing.

introduced or encouraged for one reason or another. These "survivor" butterflies, which have demonstrated their ability to overcome adversity or adapt to changing conditions in our area, are obviously the best candidates for encouragement by the urban butterfly gardener.

Lunch for butterflies

Surprisingly, there have been very few studies aimed at discovering the specific flowers in Los Angeles that are attractive to our particular species of butterflies. But there are several plants that attract so many butterflies that it has been impossible not to notice. In general, red, orange, lavender, and lilac seem to be the blossom colors that butterflies prefer. And the following plants are favorite nectar sources for a number of species.

- Lantana shrubs *(Lantana camara* and hybrids) are among the best butterfly plants in Los Angeles. The Fiery Skipper likes the varieties with orange flowers; other butterflies prefer those with lilac and lavender blooms; *Lantana montevidensis*, a well-known ground cover, is a superior nectar source.
- The shrubs or small trees that are species of *Buddleia* have been dubbed Butterfly Bushes because of their broad appeal. Of the types readily available at nurseries, *Buddleia davidii*—which has fragrant lilac flowers with orange eyes—is perhaps the best choice for the butterfly gardener because it blooms in mid-summer when most butterflies are on the wing. (In southern California, some *Buddleia* plants are plagued by the leaf-rolling larvae of a moth and may not succeed without applications of insecticide, which of course may not be good for butterflies.)
- Marigolds *(Tagetes* species) and Zinnias *(Zinnia elegans)* are annuals that produce long-lasting, vividly colored blossoms popular with a number of butterflies; the orange-flowered varieties are particularly attractive to skippers.
- Cape Plumbago *(Plumbago auriculata)*, a perennial shrub that produces white to light blue flowers almost year round, attracts the Gray Hairstreak and the Marine Blue and other blue butterflies.
- Wild Buckwheats *(Eriogonum* species), which are native in most parts of the West, are attractive nectar sources for the blues, and in the foothills, for the Mormon Metalmark, whose larvae also feed on the plants.
- Milkweeds *(Asclepias* species). A native local species *(Asclepias eriocarpa)* has hairy leaves, which may discourage feeding by Monarch larvae. The orange- and red-flowered *A.*

curassavica, a subtropical ornamental milkweed, is perhaps the best type to use to attract Los Angeles area butterflies.

■ Glossy Abelia *(Abelia grandiflora),* with its showy white or pink tinged flowers, is the most popular species of this genus of shrubs available at nurseries; it attracts Fiery Skippers, Monarchs, and Western Tiger Swallowtails.

If you really want butterflies, you gotta have "worms"!

Remember last summer? You never got around to digging up that big fennel weed on the corner of your lot or to ripping out the passion vine that threatened to obscure your favorite hedge. Somehow, you always found an excuse not to weed and prune and apply insecticide as much as you thought you should. Well, you can now replace your guilt with pride, for a lazy gardener is one of the best friends of wildlife, including butterflies and their wormlike caterpillars.

Without realizing it, the procrastinator described above set the dining table for the larvae of two of Los Angeles's most striking butterflies—with fennel for the Anise Swallowtail's caterpillars and the passion vine for Gulf Fritillary larvae. If you want to manage a garden to encourage butterflies, you need to provide not only nectar sources to sustain the adults but also the proper plants to nourish caterpillars.

The caterpillar is like a self-stuffing sausage, gorging itself on leaves or flowers and pausing only occasionally to shed its skin when the "casing" becomes too tight. When growth is complete, the caterpillar sheds its skin one last time, to reveal the pupa, from which the fully grown adult butterfly will emerge some time later.

Unfortunately, caterpillars are usually treated as objects of scorn, if not subjected to full-scale eradication attempts. But a close, unemotional inspection reveals that, in their own way, they are every bit as handsome as the adult butterflies they are to become. The color of their skin may match that of their food plant, or it may be brightly patterned to warn potential predators of their unpalatability. The body may be smooth and virtually naked, or covered with fine fuzz, or adorned with bizarre knobs and spines. Each species is different, and the variety is virtually endless.

If you really want to coax butterflies to linger in your garden, rather than just dropping in for a quick sip of nectar, you need to provide food for their caterpillars. Basically, the butterfly enthusiast has three gardening options. The easiest course is to tolerate the caterpillars that have already been attracted to the garden. You can also revel in the conservationist "lazy gardener" approach and allow weeds to remain wherever possible, even if only in a corner devoted to that purpose. And, to attract additional kinds of butterflies, you can add plants known to be favored by local species.

On the following pages, we profile a number of species of butterflies that are found in the Los Angeles Basin, along with information about the local plants where the larvae may feed. In addition, several species that are found only in the beach cities, and a number of butterflies that frequent foothill communities in the Los Angeles area, are listed near the end of this book. The various butterflies are described roughly in the order of their local abundance, with those that are very common covered first.

If you are already blessed with flocks of butterflies, you must be doing

something right! This book may help you recognize specifically how you have encouraged your resident lepidopterans, so that you can continue the same practices. And it may give you a few ideas for attracting an even greater variety of species.

WHEN MY NEIGHBOR, the late *Los Angeles Times* columnist Jack Smith, learned through an earlier version of this article in TERRA that the passion vine is the food plant for the caterpillars of the Gulf Fritillary, he underwent a sort of metamorphosis himself:

> I thought back to springs past, when I had fought savagely but in vain against the passion vine that was violating our lovely pepper tree, seducing it with purple flowers and squeezing it lifeless in irresistible arms. I fought it like a Knight Templar in hand-to-hand combat with the heathen, cutting it down again and again, only to see it spring back, more passionate than ever. Finally, I retreated and left it to my wife.
>
> And all the time, if Donahue is right, the passion vine was surrendering its own flesh to my caterpillars, and in time it would be transformed into the lovely orange, black and silver fritillary that gave such color and motion to our acre.
>
> I went down to look at the pepper tree, on our second level just at the edge of the canyon, to see if the vine was back. I hoped so. I hated to think of a summer without butterflies.

JULIAN P. DONAHUE
Assistant Curator Emeritus

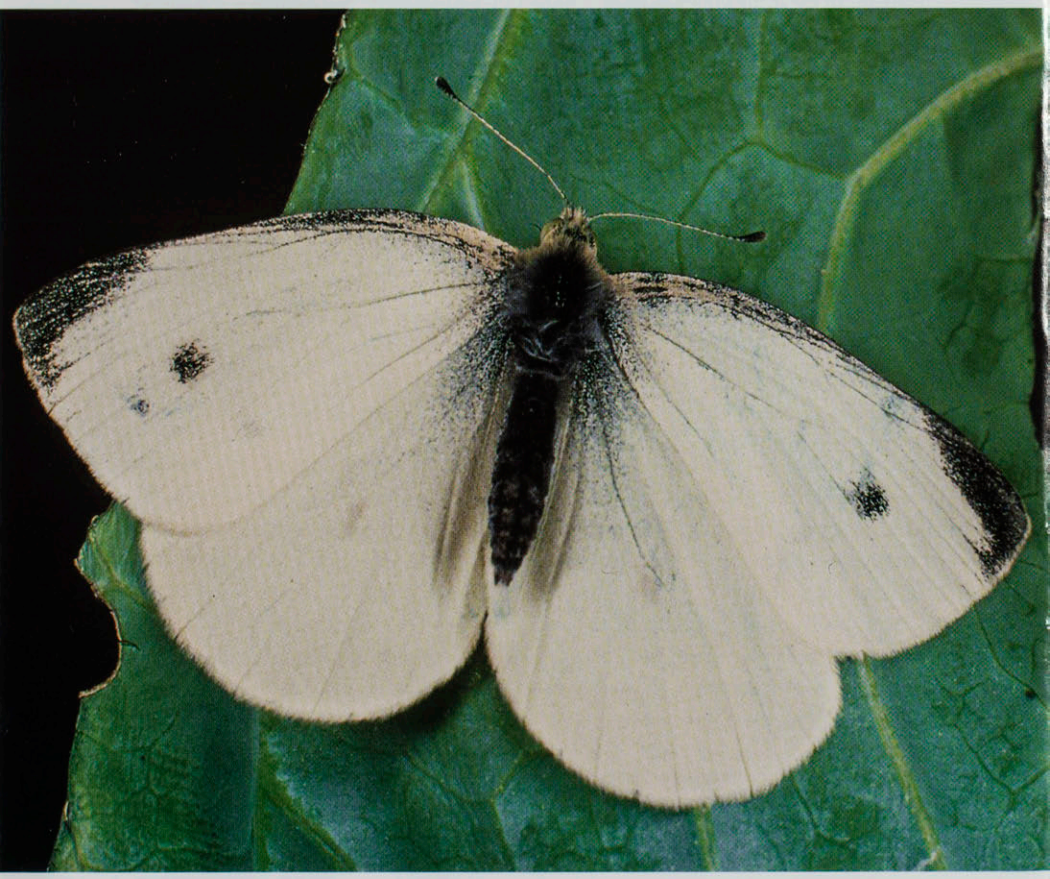
© 1998 MARC CARTER

Julian Donahue is an expert in western moths and butterflies and an avid proponent of butterfly gardening and conservation. In the 23 years that he served as assistant curator of entomology for the Natural History Museum, he was responsible for curation and documentation of the Lepidoptera collection, and he continues to contribute to its growth. He is a past president of The Lepidopterists' Society and has been the society's assistant secretary in charge of the membership database since 1986. He is currently active in the museum travel program, escorting museum members to many parts of the world to view butterflies and other natural wonders.

This article is based on "Take a Butterfly to Lunch," by Julian P. Donahue, TERRA, vol. 14, no. 3, winter 1976, pages 3–12. The quote from John A. Comstock is from *Butterflies of California*, privately published, 1927. Jack Smith's article appeared in the *Los Angeles Times*, April 13, 1976.

SOUTHERN CALIFORNIA BUTTERFLIES

Scores of butterflies live part or all of the year in southern California. The following species are found in urban and suburban areas and may be encouraged to take up residence in your garden; the listings are arranged with the most common species first.



© 1999 Peter J. Bryant

Cabbage White *(Pieris rapae)*

This common and wide-ranging butterfly was introduced into Canada from Europe in the mid-nineteenth century and has since spread all over North America; unlike many other butterfly species, it flourishes in urban areas. It is present in southern California year round; the adult is medium-sized, with a wingspan of 1½ to 2 inches, and bobs up and down in its fairly rapid flight.

The caterpillars, which are pale to medium green depending on the color of their food source, feed on plants of the mustard family, including cabbage, turnip, and kale; in southern California their preferred foods appear to be weeds, such as Wild Mustard *(Brassica rapa* subspecies *sylvestris)* and Wild Radish *(Raphanus sativus);* they are also fond of garden nasturtiums.

© 1978 Max E. Badgley

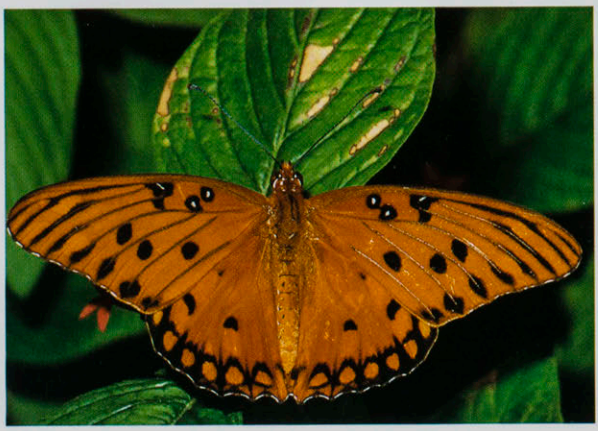
Gulf Fritillary *(Agraulis vanillae)*

A spectacular plant, the passion vine, is host to the caterpillars of this lovely butterfly, which has silvery white spots on its underwings. When the ornamental vine was introduced into southern California gardens, the tropical butterfly followed; because the larval food plant contains a toxic chemical that is passed along to the adult, predators tend to leave both the caterpillars and the butterflies alone.

The adult is fairly large, with a wingspan of from 2 to 3 inches, and a fast flyer; it is often mistaken for the much larger Monarch butterfly. The caterpillars are purplish or dark gray with orangish-brown stripes and spines along the sides of the body; they appear to prefer the

© Jess Morton

Blue Crown Passion Flower *(Passiflora caerulea),* which has small five-lobed leaves and rather delicately colored flowers (a hybrid vine, *Passiflora alatocaerulea,* which has thick three-lobed leaves and more vibrantly colored flowers, is more popular with many gardeners, in part because it is resistant to the Gulf Fritillary's caterpillars!).



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Pygmy Blue © 1988 Peter J. Bryant

Marine Blue © 1994 Jess Morton

Marine Blue © Peter J. Bryant

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Marine Blue *(Leptotes marina)*
Pygmy Blue *(Brephidium exile)*

The upper side of the wings of the Marine Blue are lavender blue and slightly transparent, so that the underside, which is zebra-striped in white and gray, is faintly visible. It is found throughout southern California and is often quite abundant in areas where there are large plantings of the larval food plants—sweet pea, wisteria, and other members of the pea family. The larva is variably colored, from pure whitish green, to rose and green, to brown with darker chocolate-colored bands; it feeds on the buds and flowers of its hosts and is particularly fond of the Cape Plumbago *(Plumbago auriculata)*. The adult, which has a wingspan of less than 1 inch, flutters in tiny circles around the host plant.

The Pygmy Blue is one of the world's smallest butterflies, with a wingspan that, even on the largest individuals, rarely exceeds ½ inch. The tiny grublike caterpillars feed on Saltbush *(Atriplex* species) and Pigweed *(Chenopodium* species). The species is widespread, and the adults are particularly abundant in alkaline valleys and coastal salt marshes and along beach bluffs where the salt-loving food plants grow, although they may not be particularly noticeable because of their tiny size and weakly fluttering flight pattern.

Fiery Skipper © 1977 John H. Hoffman/Bruce Coleman, Inc.

Fiery Skipper © 1975 Charles L. Hogue

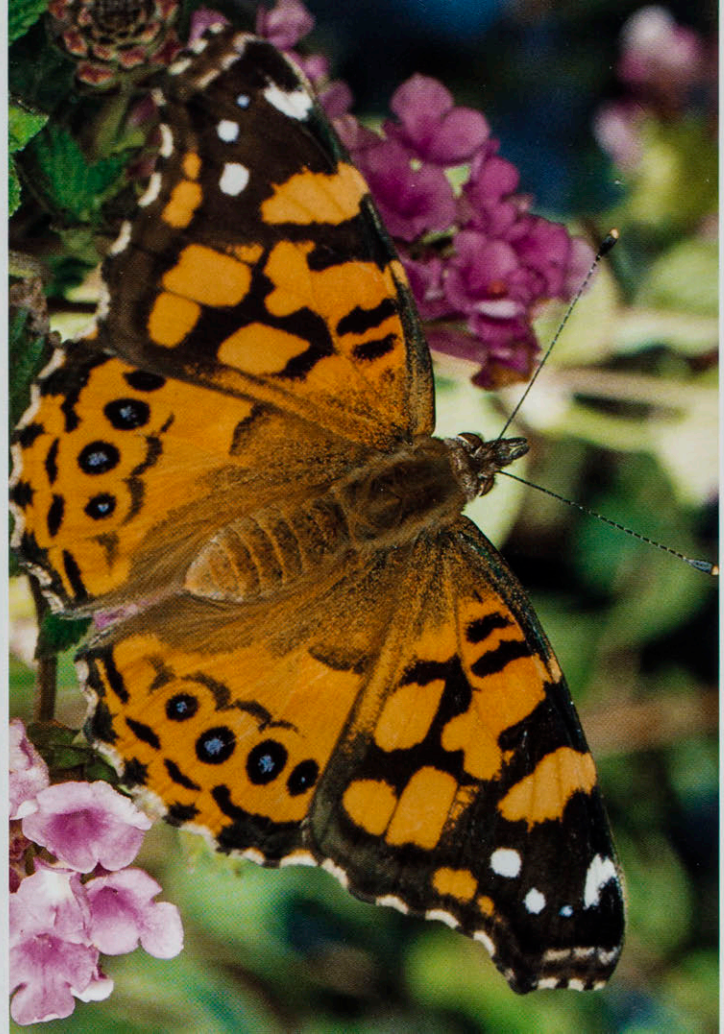
Fiery Skipper *(Hylephila phyleus)*
Umber Skipper *(Poanes melane)*
With their stout bodies, large heads, and relatively short wings, these skippers resemble small moths to some people. When at rest, they hold the two pairs of wings at different angles—the upper pair upright over the body and the hind wings cocked out horizontally. The caterpillars' dark heads are set off by a constriction that forms a "neck."

The Fiery Skipper, named for its vivid yellow-orange color, is in flight from April to December; because its larvae feed on

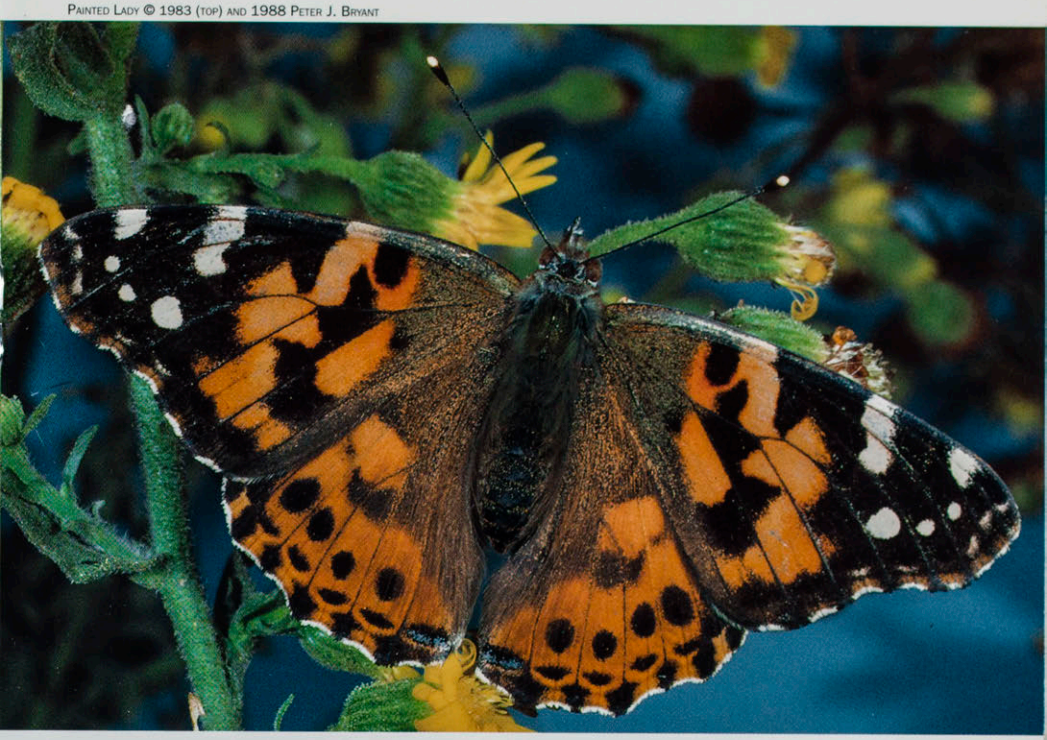
lawn grasses such as Bermuda *(Cynodon dactylon)*, the species is actually more abundant in urban areas than in undisturbed habitats. The caterpillar lives concealed in a silken tube woven near the base of lawn grasses. The butterfly, which is especially fond of sipping from lantanas, has a wingspan of only 1 to 1¼ inches but is fast and powerful if erratic in flight. Adults are quite territorial: in his book *Insects of the Los Angeles Basin,* Charles Hogue noted that he had seen them chasing hummingbirds out of their domains!

With a wingspan of from 1⅛ to 1¾ inches, the Umber Skipper is a little larger than its cousin; its wings are not orange but a rich brown. There are two broods per year, and the butterfly is seen from March to June and between July and October. The caterpillar feeds on grasses and has been found locally on Tufted Hair Grass *(Deschampsia cespitosa)* and Goldentop *(Lamarckia aurea)*. Although the Umber Skipper is not common in our area, it has colonized new areas in southern California in the last century and seems capable of adapting well to landscape changes made by people.

West Coast Lady (top and bottom) © 1988 Peter J. Bryant



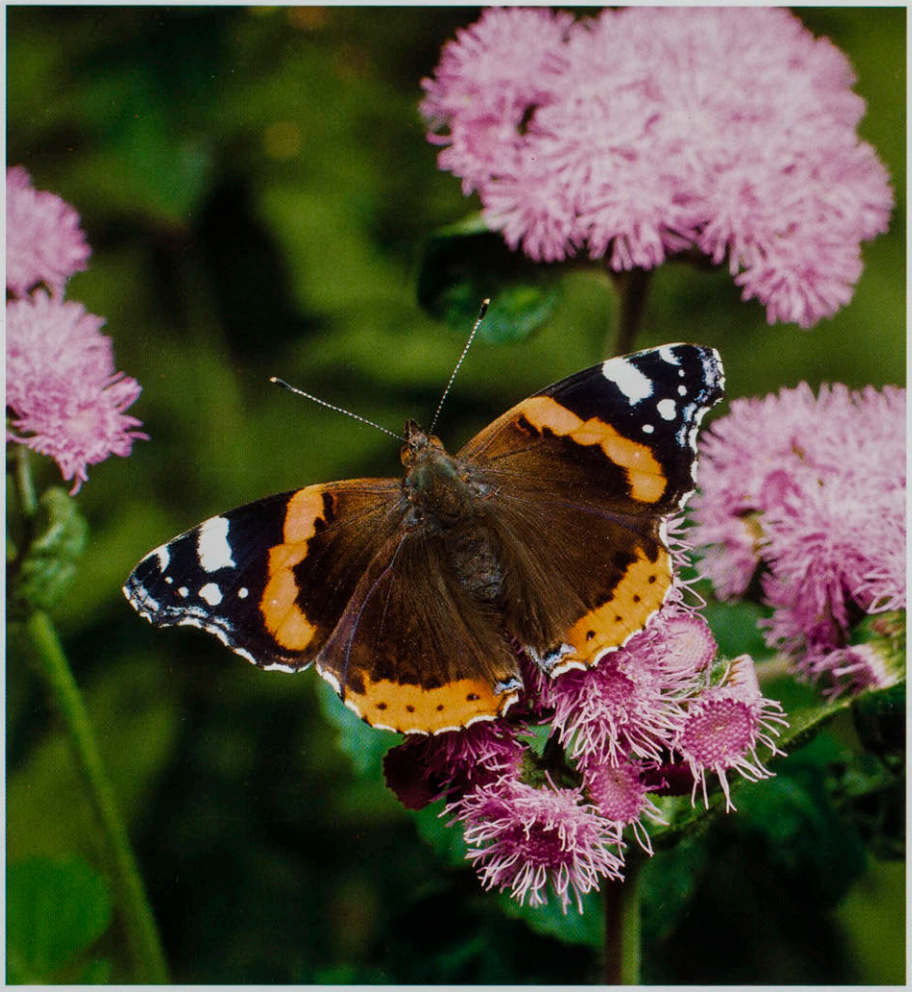
PAINTED LADY © 1983 (TOP) AND 1988 PETER J. BRYANT



Painted Lady *(Vanessa cardui)*
West Coast Lady *(Vanessa annabella)*

The Painted Lady (wingspan of 2 to 2¼ inches) occurs on all continents except Antarctica and on many islands, including southern California's Santa Cruz. In some years, millions of adults migrate north through the Los Angeles area, flying a few feet off the ground and only gaining altitude to move over obstacles rather than around them. The migrations, unlike those of the Monarch, appear to be one-way. The eggs can be laid on any of a variety of plants; in the Los Angeles area, the caterpillars are often found on hollyhocks and on Cheeseweed *(Malva parviflora)*, a weed plant that is common in our vacant lots. In some areas, thistle *(Cirsium* species) is both the larval food plant and a source of nectar for the adult. The butterfly has a hurried and deliberate flight.

The West Coast Lady resembles its cousin but is a bit smaller, with a wingspan of about 1¾ to 2 inches. This "Lady" occurs only in the West; although some individuals may travel east to the Rockies in late summer, the species is not given to the mass migrations of the Painted Lady. The favorite larval food plants are Cheeseweed, especially *Malva parviflora,* and nettles. While feeding, the caterpillar folds spun silk webbing across its leaf to form a shelter. The lively adult males are territorial, returning again and again to the same patch of bare ground; the butterflies also congregate on bare earth or on hilltops.



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Red Admiral *(Vanessa atalanta)*
This beautiful black and red butterfly is found from subarctic Canada to Central America. In most of its range, the food plants for the larvae are hops and native nettles of the family Urticaceae, including pellitory *(Parietaria* species). The species is not common in southern California, but it is known to feed here on the ground cover Baby's Tears *(Soleirolia soleirolii)*.

The larva is black and warty, studded with hundreds of white velvety knobs as well as bands of short spines. For shelter, it draws the edges of a leaf together and binds them with silken threads to make a protective tent. There are several broods per year, and the butterfly, which has a wingspan of about 2 inches, may be seen from March to November. The male sets up a territory—often in a sunlit patch of driveway or patio—and visits and perches there daily (a person's shoulder or head sometimes makes a good vantage point!).

Mourning Cloak *(Nymphalis antiopa)*

One of the longest-lived butterflies, the Mourning Cloak (which has a wingspan of 2¼ to 2½ inches) may survive for up to 10 months, overwintering in tree crevices or open structures such as sheds, garages, and attics and emerging on warm and sunny winter days to fly about. It is inquisitive and aggressively territorial and yet another species that will settle on any convenient perch, including a raised finger!

When first hatched, the larvae stay together in a silken communal nest; later they are solitary feeders. The caterpillar is purplish black with bands of long, thin branching spines, white speckling, and a row of orange spots along its side. The hosts are elm, willow, possibly birch and poplar, and also the Floss Silk Tree *(Chorisia speciosa)*. The contrast between the adult's yellow-bordered black upper wings and their mottled brown undersides is dramatic; the color and patterns of the butterfly's underwings offer an excellent camouflage when it is at rest on a tree trunk.

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Anise Swallowtail *(Papilio polyxenes zelicaon)*
This butterfly, which has a wingspan of 3½ inches, is generally the most common swallowtail west of the Rockies, and adults are present year round in southern California, although the species is not as often seen here as in the past. The host plants for the larvae are in the carrot family, Apiaceae, especially Common or Sweet Fennel *(Foeniculum vulgare),* a licorice-flavored weed that is sometimes confused with the cultivated herbs called anise.

The larvae at first resemble bird droppings but then become fat green caterpillars with black stripes broken by yellow or orange spots. When disturbed, the mature larva rears up and raises fleshy orange horns from the back of its head; these exude a musty odor presumably repellant to some predators. The adult males are dedicated "hilltoppers" and will congregate on prominences in the landscape, looking for females.

Mature larva © 1999 Peter J. Bryant

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Monarch *(Danaus plexippus)* This conspicuous species (wingspan 3 to 4 inches) is unique among butterflies in that it migrates in the way that some birds do, although no individual butterfly makes the complete round trip. In fall just-emerged Monarchs fly southwest from throughout western North America to winter on the California coast between Monterey and Mexico. In spring, the migrants mate and populate the deserts and mountains of the West; after laying eggs along the way, these 6- to 9-month-old adults die. The northward journey is continued by the new generations, and then cold fall weather and shorter days prompt the last generation of the year to travel south.

The larval food plant is milkweed—in southern California, species of *Asclepias.* The caterpillars ingest naturally occurring toxins with their diet, and these are passed on to the adults, giving them a bad reputation with potential predators. At least one local garden stocked with the host plant has provided a refueling station and breeding ground for the spring and summer generations of this dramatic butterfly.

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Gray Hairstreak *(Strymon melinus)*

This little butterfly is found throughout North America, from southern Canada through Mexico, and is fairly common in southern California, especially in the summer and fall. The species is a generalist, feeding on a number of plants; but locally it prefers Cheeseweed and other species of *Malva,* which are abundant in vacant lots. The larvae feed on the buds and fruits or young seeds of their host and can be a pest on beans; they have been seen in southern California on cultivated hibiscus.

The butterfly, which has a wingspan of from ¾ to 1⅛ inches, is energetic and given to short bursts of flight followed by nervous pacing around on its perch and bouts of rubbing its hind wings together. Males are territorial and will dart out from their resting places after interlopers of the same sex or potential mates.

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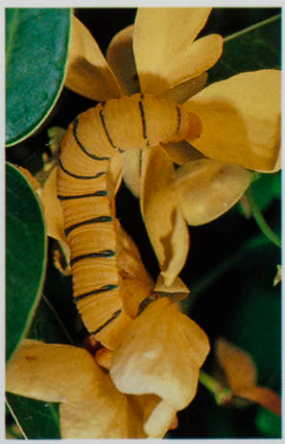
Cloudless Sulphur *(Phoebis sennae)*

In 1927, John A. Comstock noted that "this brightly colored and agile butterfly is a familiar sight as it dodges through the gardens and parks of southern California, in search of the yellow Cassia blossoms." But today this good-sized sulphur (wingspan about 2 inches) is much less abundant in the Los Angeles Basin and is probably not a permanently established breeding resident. The species undertakes northward migrations in the summer months and may go through a generation or two on our local cassias.

The mature caterpillar may be green or brilliant yellow and covered with tiny black nodules; it makes a nest out of silk and the leaves of the host plants, which include *Senna* species introduced from the American tropics as well as the native *Senna armata* and *S. covesii*. The adults have a rapid, dodging flight and will nectar on lantana, hibiscus, and bouganvillea and other plants with red, yellow, and orange flowers.



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Funereal Duskywing
(Erynnis funeralis)
This is a large black skipper (wingspan 1¼ to 1⅝ inches) with white fringe on its hind wings. Like other skippers, it has a powerful if somewhat jerky flight, in contrast to the fluttering or gliding and soaring maneuvers of the true butterflies. Because it wanders long distances in search of the larval food plants—a variety of legumes—it is common over a large range and present during all seasons.

© Max E. Baggley

Locally the larvae have been found on Deerweed *(Lotus scoparius;* also called California Broom); the caterpillar constructs a loose tent of leaves and silk to hide in while it feeds. The adult butterflies are often found in hilly areas, buzzing from perch to perch.

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Common Buckeye *(Junonia coenia)*
This pretty butterfly has a number of eyespots on its upper wings; the white marks over the largest of these look a little like eyebrows. It ranges throughout the U.S.; although it is not common in southern California, it is a good species to encourage. The butterflies are on the wing throughout the year but are most evident in the fall.

The larvae feed locally on snapdragons *(Antirrhinum majus),* monkey flower *(Mimulus* species), and the common lawn weed plantains *(Plantago erecta* and *P. lanceolata);*

The male butterfly is pugnacious, darting out from its perch to investigate any large insect flying through its territory. If the intruder is a female, she will be followed closely; other butterflies or insects will be "beaten" with wing blows and chased away!

© 1991 Jerry F. Butler & Don W. Hall, University of Florida

Above: Dainty Sulphur © 1991 Peter J. Butler *Opposite:* California Sister. Caterpillar and pupa © 1991 Keith V. Wolfe. Adult © 1999 Peter J. Bryant

Other species present in the Los Angeles "flatlands"

American Lady *(Vanessa virginiensis)* Butterfly has a 1¾- to 2⅛-inch wingspan; larvae feed on the cudweeds *(Gnaphalium* species and *Anaphalis margaritacea,* also called everlastings).

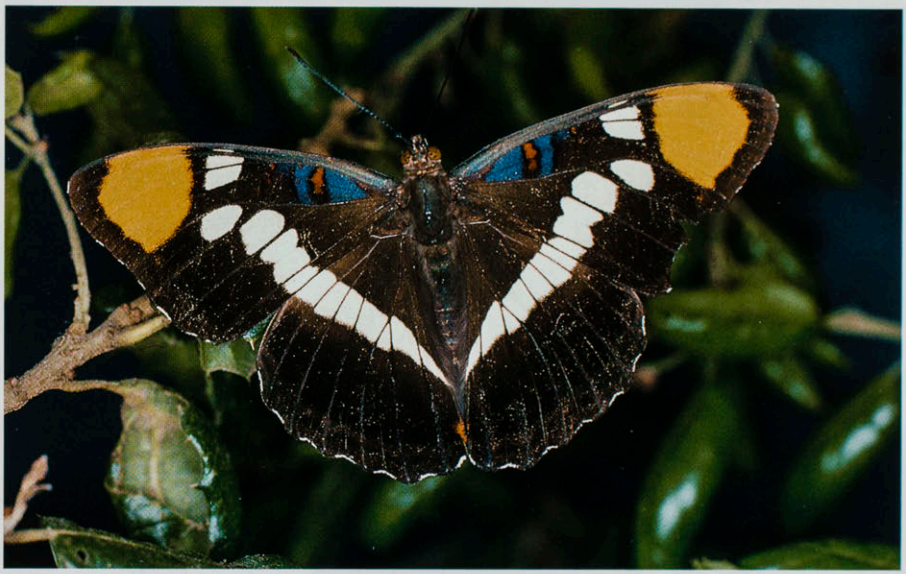
Woodland Skipper *(Ochlodes sylvanoides)* Butterfly has a ¾- to 1⅛-inch wingspan; larvae feed on various grasses, especially rye *(Elymus* species) and lawn grasses.

Common Checkered Skipper *(Pyrgus communis)* Butterfly has a ¾- to 1¼-inch wingspan; larvae feed on weed mallows, most often Cheeseweed and other common mallows *(Malva* species); also found on hollyhocks and hibiscus.

Migrating species occasionally present in the basin

Sleepy Orange *(Eurema nicippe)* Butterfly has a 1½-inch wingspan; larvae feed on cassias and sennas *(Senna* species) and other legumes such as clover (*Trifolium* species).

Dainty Sulphur *(Nathalis iole)* Butterfly has a ¾- to 1⅛-inch wingspan; larvae feed on Beggar-tick or Bur Marigold *(Bidens pilosa)* and also on garden marigolds *(Tagetes* species).



Other butterflies found in the beach cities

Square-spotted Blue *(Euphilotes bernardino)* Butterfly has a ¾- to 1-inch wingspan; larvae feed on native and cultivated buckwheats such as *Eriogonum fasciculatum* and *E. parvifolium.*

Wandering Skipper *(Panoquina errans)* Butterfly has a 1- to 1⅛-inch wingspan; larvae feed on Salt Grass *(Distichlis spicata)* and thin-bladed grasses.

Other butterflies found in the foothills of the basin

Western Tiger Swallowtail *(Pterourus glaucus rutulus)* Butterfly has a 4-inch wingspan; larvae feed on California Sycamore *(Platanus racemosa),* willow *(Salix* species), and aspen, cottonwood, and poplar *(Populus* species).

Pale Swallowtail *(Pterourus eurymedon)* Butterfly has a 2¾- to 4-inch wingspan; larvae feed on buckthorns such as Redberry *(Rhamnus crocea)* and Coffeeberry (*R. californica)* and also on wild lilac *(Ceanothus* species).

Lorquin's Admiral *(Basilarchia lorquini)* Butterfly has a 2¾- to 4-inch wingspan; larvae feed on willows *(Salix* species) and Western Chokecherry *(Prunus virginiana* variety *demissa).*

California Sister *(Adelpha bredowii)* Butterfly has a 2¼-inch wingspan; larvae feed on Canyon Oak *(Quercus chrysolepis)* and related live oaks.

Silvery Blue © 1991 Peter J. Bryant

Great Purple Hairstreak © 1991 Peter J. Bryant

Common Ringlet *(Coenonympha tullia)* Butterfly has a 1⅛-inch wingspan; larvae feed on native and introduced grasses.

Variable Checkerspot *(Euphydryas chalcedona)* Butterfly has a 1¼- to 1¾-inch wingspan; larvae feed on figworts, especially the native Sticky Monkey Flower *(Mimulus aurantiacus).*

Great Purple Hairstreak *(Atlides halesus)* Butterfly has a 1¼- to 1½-inch wingspan; larvae feed on common mistletoes *(Phoradendron* species) found on sycamores and cottonwoods.

Variable Checkerspot © 1990 Sylvia Dujan Sharnoff

Mountain Mahogany Hairstreak *(Satyrium tetra)* Butterfly has a 1¼- to 1½-inch wingspan; larvae feed on Mountain Mahogany *(Cercocarpus betuloides).*

Sylvan Hairstreak *(Satyrium sylvinus)* Butterfly has a 1¼- to 1⅜-inch wingspan; larvae feed on willows *(Salix* species).

California Hairstreak *(Satyrium californica)* Butterfly has a 1⅛- to 1⅜-inch wingspan; larvae feed on oak *(Quercus* species).

Acmon Blue *(Plebejus acmon)* Butterfly has a ¾- to 1-inch wingspan; larvae feed on Deerweed *(Lotus scoparius)* and other *Lotus* species; buckwheats *(Eriogonum* species); and locoweed *(Astragalus* species).

Sara Orangetip *(Anthocharis sara)* Butterfly has a 1¼- to 1⅝-inch wingspan; larvae feed on wild mustards, including species of *Arabis, Barbarea, Brassica, Sisymbrium,* and *Descurainea.*

Sonoran Blue *(Philotes sonorensis)* Butterfly has a ⅞- to 1-inch wingspan; larvae feed on rock lettuce, live-forever, and other rosette-forming succulents of the genus *Dudleya.*

Silvery Blue *(Glaucopsyche lygdamus)* Butterfly has a 1- to 1¼-inch wingspan; larvae feed on Deerweed *(Lotus scoparius).*

Western Tailed Blue *(Everes amyntula)* Butterfly has a 1- to 1¼-inch wingspan; larvae feed on locoweeds of the genus *Astragalus.*

Mormon Metalmark *(Apodemia mormo)* Butterfly has a ⅞- to 1¼-inch wingspan; larvae feed on buckwheats *(Eriogonum* species).

Variable Checkerspot © 1997Stuart Wilson

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Natural History Museum entomologists and educators among the hundreds of drawers holding the museum's collections. *From left to right:* Art Evans, director of the Insect Zoo and a specialist in scarab beetles, with a Giant African Walkingstick from the zoo; Brian Brown, associate curator for Entomology and head of the museum's Entomology Section; Roy Snelling, an expert in ants, bees, and wasps and an emeritus entomologist for the museum; Brian Harris, curatorial assistant responsible for various aspects of the care of the collection; and Sarah Thompson, who manages the Education Division's outreach programs, including the Traveling Insect Zoo.

Insects at the Natural History Museum

Educational programs

Open the door to the refrigerator in the Ralph M. Parsons Insect Zoo and—to the tune of "The worms crawl in, the worms crawl out"—you'll view minidioramas demonstrating that insects can and do eat almost anything. The point is underscored in nearby terrariums, where giant cockroaches, gently swaying walkingsticks, a black widow in her rather disorganized web, and forty other species of live arthropods nibble at their various daily rations.

Gallery attendants demonstrate the inhabitants' movements and body structures, to the delight of tour groups and other onlookers, and use the wide range of special displays to explain the arthropods' life cycles and social structures as well as their astounding diversity and clever defense mechanisms. Other exhibits focus on the insect's role in art and culture; the back wall of the zoo profiles the life and work of Charles L. Hogue, a distinguished scientist who was curator of entomology at the museum for more than 30 years.

The Insect Zoo, located on the mezzanine above the Ralph M. Parsons Discovery Center in the Museum of Natural History in Exposition Park, is just one of the programs organized by the museum's Education Division to promote understanding and enjoyment of insects:

- Tracking the Monarch, yearly trips to the migrating butterfly's overwintering sites on the California coast, give a chance to view thousands of roosting Monarchs as well as to participate in a tagging program that scientists are using to reveal details of the travels of these delicate-looking but hardy creatures. A number of other field trips and special presentations on insects for adults and children are offered throughout the year.

- The Insect Fair, the largest event of its kind in the U.S., brings together insect enthusiasts and dozens of exhibitors offering live and preserved arthropods as well as books, toys, educational tools, and craft activities and collectibles with an insect theme. The fair fills the halls and galleries of the museum over a weekend each spring.

- The Tiniest Teachers is a hands-on workshop to assist educators in incorporating insects into their classroom activities. Teachers learn techniques for collecting, rearing, and displaying arthropods; they are also provided with resources for harnessing children's natural fascination with insects to instill basic biological and ecological principles.

- The Traveling Insect Zoo, a very popular outreach program, visits schools, afterschool programs, summer camps, and church and community centers with live tarantulas, millipedes, and walking sticks and a dynamic presentation about insects and their kin.

For more information about the Insect Zoo, group tours, and the special offerings described here, please call the Education Division at 213/763-3534.

Research and collections

The museum's insect programs are grounded in the Entomology Section's extensive collections—more than 5 million specimens of insects, spiders, and their relatives from throughout the world. The collection includes one of the nation's most comprehensive arrays of ants, bees, and wasps as well as a major section on butterflies and moths. In addition to providing a wealth of material for exhibitions and public programs, these resources—which are studied and cared for by staff entomologists—form the basis for research aimed at understanding the interrelationships of the estimated 10 million species of insects and working to preserve their biodiversity, which is so essential to the functioning of earth's ecosystems.

Information on the collections is given on the museum's web page, at www.nhm.org/lacmnh/departments/research/entomology/. Once a year, during the annual Open House, members of the museum can view the entomology collections and visit with curatorial staff members; to join or purchase gift memberships, please call the Membership Office at 213/763-3426.

Resources

Books

Insects of the Los Angeles Basin, by Charles L. Hogue. Los Angeles: Natural History Museum of Los Angeles County, second edition, 1993.

The Butterflies of Southern California, by Thomas C. Emmel and John F. Emmel. Los Angeles: Natural History Museum of Los Angeles County, 1973.

A Field Guide to Western Butterflies (Peterson Field Guide Series), by Paul A. Opler. New York: Houghton Mifflin, second edition, 1999.

The Audubon Society Field Guide to North American Butterflies, Robert Michael Pyle, consulting lepidopterist. New York: Knopf, 1981.

Butterflies of Greater Los Angeles (color poster), by Rudi Mattoni. Beverley Hills, California: Lepidoptera Research Foundation [Rudi Mattoni], 1990.

The Butterflies of North America: A Natural History and Field Guide, by James A. Scott. Stanford, 1986.

The Butterflies of Orange County, California, by Larry J. Orsak. University of California, Irvine, 1977.

California Butterflies, by John S. Garth and J.W. Tilden. Berkeley, Calif.: University of California, 1988.

The Butterfly Garden: Turning Your Garden, Window Box or Backyard into a Beautiful Home for Butterflies, by Mathew Tekulsky. Boston: Harvard Common Press, 1985.

Butterfly Gardening: Creating Summer Magic in Your Garden, created by Xerces Society in association with Smithsonian Institution. San Francisco: Sierra Club Books, second edition, 1998.

Sunset Western Garden Book, sixth edition. Menlo Park, California: Sunset Publishing, 1995.

World Wide Web

Natural History Museum of Los Angeles County, at www.nhm.org. See the sections on Entomology and Education.

North American Butterfly Association, at www.naba.org. Includes postings by the Los Angeles Area Butterfly Society.

The Lepidopterists' Society, at www.furman.edu/~snyder/snyder/lep. For the society's newsletter, see www.esb.utexas.edu/philjs/News/news/html.

Help with Species and Pest Identification

Agricultural Entomologist, Los Angeles County Agricultural Commissioner's Office, 3400 La Madera Avenue, El Monte, California 91732; telephone 626/575-5469 or 626/575-5477

Entomology Section, Natural History Museum, telephone 213/763-3363; E-mail bbrown@nhm.org

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
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Index

to butterflies and plants (**bold** indicates an illustration)

Abelia grandiflora, 10
Acmon Blue, 31
Adelpha bredowii, **29**
Admiral: Lorquin's, 29; Red, **8, 20**
Agraulis vanillae, **14**
American Lady, **8,** 28
Anaphalis margaritacea, 28
Anise Swallowtail, **8,** 10, **22,** 35
Anthocharis sara, 31
Antirrhinum majus, 27
Apodemia mormo, 31
Arabis, 31
Asclepias, 9-10, 23; *curassavica,* 9-10; *eriocarpa,* 9
Aspen, 29
Astragalus, 31
Atlides halesus, **30**
Atriplex, 15
Baby's Tears, 20
Barbarea, 31
Basilarchia lorquini, 29
Beans, 24
Beggar-tick, 28
Bermuda grass, 17
Bidens pilosa, 28
Birch, 21
Blue: Acmon, 31; El Segundo, 6; Marine, **8,** 9, **15;** Palos Verdes, 6; Pygmy, **8, 15;** Silvery, **30,** 31; Sonoran, 31; Square-spotted, 29; Western Tailed, 31
Blue Crown Passion Flower, 14
Bouganvillea, 25
Brassica, 31; *rapa* sub. *sylvestris,* 13
Brephidium exile, **15**
Buckthorn, 29
Buckwheat, 29, 31; Wild, 9
Buddleia, 9; *davidii,* 9
Bur Marigold, 28
Butterfly Bush, 9
Cabbage, 13
Cabbage White, 7, **8, 12-13**
California Broom, 26
California Hairstreak, 31
California Sister, **29**
California Sycamore, 29
Canyon Oak, 29
Cape Plumbago, 9, 15
Cassia, 25, 28
Ceanothus, 29
Cercocarpus betuloides, 31
Cheeseweed, 19, 24, 28
Chenopodium, 15
Chokecherry, Western, 29
Chorisia speciosa, 21
Cirsium, 19
Clover, 28
Cloudless Sulphur, **2, 8, 25**
Coenonympha tullia, 30
Coffeeberry, 29
Common Buckeye, **8, 27**
Common Checkered Skipper, **8,** 28
Common Fennel, 22
Common Ringlet, 30
Comstock's Fritillary, 7
Cottonwood, 29, 30
Cudweed, 28
Cynodon dactylon, 17
Dainty Sulphur, **28**
Danaus plexippus, **23**
Deerweed, 26, 31
Deschampsia cespitosa, 17
Descurainea, 31
Distichlis spicata, 29
Dudleya, 31
Elm, 21
El Segundo Blue, 6
Elymus, 28
Eriogonum, 9, 31; *fasciculatum,* 29; *parvifolium,* 29
Erynnis funeralis, **26**
Euphilotes bernardino, 29
Euphydryas chalcedona, 30, **31**
Eurema nicippe, 28
Everes amyntula, 31
Everlasting, 28
Fennel, 10; Common, 22
Fiery Skipper, **8,** 9, 10, **16-17**
Figwort, 30
Floss Silk Tree, 21
Foeniculum vulgare, 22
Funereal Duskywing, **8, 26**
Glaucopsyche lygdamus, **30,** 31
Glossy Abelia, 10
Gnaphalium, 28
Goldentop, 17
Grass, 17, 28, 29, 30; Bermuda, 17; Salt, 29
Gray Hairstreak, **8,** 9, **24**
Great Purple Hairstreak, **30**
Gulf Fritillary, 2, 7, **8,** 10, 11, **14**
Hairstreak: California, 31; Gray, **8,** 9, **24;** Great Purple, **30;** Mountain Mahogany, 31; Sylvan, 31
Hibiscus, 24, 25, 28
Hollyhock, 19, 28
Hops, 20
Hylephila phyleus, **16-17**
Junonia coenia, **27**
Kale, 13
Lady: American, **8,** 28; Painted, **8, 19;** West Coast, **8, 18,** 19
Lamarckia aurea, 17
Lantana, 9, 17, 25
Lantana: camara, 9; *montevidensis,* 9
Legumes, 26, 28
Leptotes marina, **15**
Lilac, wild, 29
Live-for-ever, 31
Locoweed, 31
Lorquin's Admiral, 29
Lotus, 31; *scoparius,* 26, 31
Mallow, 28
Malva, 24, 28; *parviflora,* 19
Marigold, 9, 28; Bur, 28
Marine Blue, **8,** 9, **15**
Milkweed, 5, 9-10, 23
Mimulus, 27; *aurantiacus,* 30
Mistletoe, 30
Monarch, 5, **6, 8,** 10, 14, 19, **23**
Monkey flower, 27; Sticky, 30
Mormon Metalmark, 9, 31
Mourning Cloak, **8, 21**
Mountain Mahogany, 31
Mountain Mahogany Hairstreak, 31
Mustard, 13, 31
Nasturtium, 13
Nathalis iole, **28**
Nettles, 19, 20
Nymphalis antiopa, **21**
Oak, 29, 31
Ochlodes sylvanoides, 28
Painted Lady, **8, 19**
Pale Swallowtail, 29
Palos Verdes Blue, 6
Panoquina errans, 29
Papilio polyxenes zelicaon, **22**
Parietaria, 20
Passiflora: alatocaerulea, 14; *caerulea,* 14
Passion vine, 10, 11, 14
Pellitory, 20
Philotes sonorensis, 31
Phoebis sennae, **25**
Phoradendron, 30
Pieris rapae, 13
Pigweed, 15
Plantago: erecta, 27; *lanceolata,* 27
Plantain, 27
Platanus racemosa, 29
Plebejus acmon, 31
Plumbago auriculata, 9, 15
Poanes melane, 16, **17**
Poplar, 21, 29
Populus, 29
Prunus virginiana var. *demissa,* 29
Pterourus: eurymedon, 29; *glaucus rutulus,* 29
Pygmy Blue, **8, 15**
Pyrgus communis, 28
Quercus, 31; *chrysolepis,* 29
Raphanus sativus, 13
Red Admiral, **8, 20**
Redberry, 29
Rhamnus: californica, 29; *crocea,* 29
Rock lettuce, 31
Rye, 28
Salix, 29, 31
Saltbush, 15
Salt Grass, 29
Sara Orangetip, 31
Satyrium: californica, 31; *sylvinus,* 31; *tetra,* 31
Senna, 25, 28; *armata,* 25; *covesii,* 25
Silvery Blue, **30,** 31
Sisymbrium, 31
Skipper: Common Checkered, **8,** 28; Fiery, **8,** 9, 10, **16-17;** Funereal Duskywing, **8, 26;** Umber, 16, **17;** Wandering, **8,** 29; Woodland, 28
Sleepy Orange, 28
Snapdragon, 27
Soleirolia soleirolii, 20
Sonoran Blue, **30,** 31
Square-spotted Blue, 29
Sticky Monkey Flower, 30
Strymon melinus, **24**
Sulphur: Dainty, **28;** Cloudless, **2, 8, 25**
Swallowtail: Anise **8,** 10, **22,** 35; Pale, 29; Western Tiger, 10, 29
Sweet Fennel, 22
Sweet pea, 15
Sycamore, 29, 30
Sylvan Hairstreak, 31
Tagetes, 9, 28
Thistle, 19
Trifolium, 28
Tufted Hair Grass, 17
Turnip, 13
Umber Skipper, 16, **17**
Vanessa: annabella, **18,** 19; *atalanta,* **20;** *virginiensis,* 28
Variable Checkerspot, 30, **31**
Wandering Skipper, **8,** 29
West Coast Lady, **8, 18,** 19
Western Chokecherry, 29
Western Tailed Blue, 31
Western Tiger Swallowtail, 10, 29
Wild Buckwheat, 9
Wild Mustard, 13
Wild Radish, 13
Willow, 21, 29, 31
Wisteria, 15
Woodland Skipper, 28
Zinnia, 9
Zinnia elegans, 9

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